different composition of those of the material of the active area, the interface being inert or quasi-inert from a physico-chemical point of view even during a writing operation of the phase-change memory cell.

See Claim 41.

The rejection of the claims under 35 U.S.C. §102(b) over Holmberg is respectfully traversed. This reference fails to disclose the claimed phase-change memory cell.

An important feature of the claimed memory cell is that the interface is inert or quasi-inert from a physico-chemical point of view even during a writing operation of the phase-change memory cell. Holmberg fails to disclose this feature for the reasons set forth below.

As previously noted by the Examiner, Holmberg does not disclose that the interface is inert or quasi-inert from a from a physico-chemical point of view. See, for example, page 3 of the Office Action dated September 23, 2009, which states in pertinent part:

> Thus, Holmberg '475 is shown to teach all of the features of the claim *with the exception of an interface, inert or quasi-inert from a physico-chemical point of view, between the active central area and each passive outmost area*. [Emphasis added.]

In Holmberg figure 3, the active central layer 29 is of an amorphous material with approximately 15-17 percent germanium although this percentage may vary from 10 to 25 percent.

The outmost layer 28 is of a germanium-tellurium composition with proportion of approximately 33 percent germanium although this percentage may vary from 25 to 45 percent.

The outmost layer 30 is in a tellurium rich material with 0 to 10 percent germanium the rest being tellurium.

Applicants note column 5, line 59 to column 6, line 4 of Holmberg. Figure 4A is a graph illustrating two states of the device. The solid line corresponds to a first state. The

solid line illustrates the germanium concentration in atomic percentage as initially deposited for the structure of figure 3 as a function of the distance of the respective layers from the top of the positive electrode 23. This graph is in a stairs form with three steps. The first step on the left corresponds to layer 30, the middle step corresponds to layer 29 and the third step on the right corresponds to layer 28.

The dotted line corresponds to a second state. The solid line represents the composition distribution that is formed after the device has been operated for many set reset cycles. The steps have disappeared. It means that the composition distribution has changed between the first state and the second state. If the composition has changed, it means that the interface between the central layer and each outmost layer is not inert or quasi inert from a physical-chemical point.

Figure 4B also illustrates this phenomenon. The solid line corresponds to the first state. It illustrates the melting temperature distribution in the three layers at the beginning. Again the dotted line is the melting temperature distribution in the three layers after many set-reset cycles. The solid line and the dotted line have not the same shape, it means that the melting temperatures in the three layers have changed and that the compositions have also changed.

In addition, it is important to note the differences in the compositions of the layers in Holmberg and the present invention.

Germanium rich layer 28: composition of germanium and tellurium; between 25% and 45% of germanium, in particular approximately 33% of germanium, see column 5, lines 21-25; [i.e., Between 75% and 55% of tellurium].

Central layer 29: composition of germanium and tellurium; between 10% and 25% of germanium, I particular 15-17% of germanium; see column 5, lines 25-28; [i.e., between 90% and 75% of tellurium].

Tellurium rich layer 30: composition of germanium and tellurium; between 0% and 10% of germanium, see column 5, lines 28-31; [i.e., between 100% and 90% of tellurium].

In the patent application:

Central layer: composition of tellurium and antimony; between 16% and 30% of tellurium; between 84% and 70% of antimony (see page 15, lines 14-16).

Passive outmost layers: composition of tellurium and antimony up to about 2% of tellurium, (see page 15, line 21).

In view of the foregoing, Holmberg fails to disclose the claimed phase-change memory cell. Accordingly, the subject matter of the pending claims is not anticipated by Holmberg. Withdrawal of this ground of rejection is respectfully requested.

The rejection of the Claim 45 under 35 U.S.C. §103(a) over Holmberg in view of Tanaka and Pertov is respectfully traversed. This reference fails to suggest the claimed phase-change memory cell.

Claim 45 depends from Claim 41. Tanaka and Pertov has been cited with respect to the dependent claims. Thus, Tanaka and Pertov do not remedy the deficiencies of Holmberg with respect to the subject matter of Claim 41 discussed above.

In view of the foregoing, the combination of Holmberg in view of Tanaka and Pertov fails to suggest the claimed phase-change memory cell. Accordingly, the subject matter of the pending claims is not obvious over the cited references. Withdrawal of this ground of rejection is respectfully requested.

Regarding the Restriction Requirement, Claims 42-59 depend directly or indirectly from Claim 41. Since Claim 41 is allowable for the reasons described above, those dependent claims are allowable as well. Accordingly, rejoinder of all of the claims is requested.

Applicants submit that the present application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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